

Name .....

1. 10.2.1 Explain the low reactivity of alkanes in terms of bond enthalpies and bond polarity. (3)
- a. Alkanes consist of what specific bonds, what are their bond energies?

- b. Describe why alkanes are stable based on their physical properties:

2. 10.2.2 Describe, using equations, the complete and incomplete combustion of alkanes. (2)
- a. What happens when alkanes are subjected to high temperatures?

- b. In terms of Bond breaking and bond forming, explain why the combustion of alkanes would be exothermic:

- c. Complete the following table for the combustion of alkanes:

Presence of Oxygen	Equation	Harm of Products
O <sub>2</sub> is readily available		
O <sub>2</sub> is limited		
O <sub>2</sub> is scarce (very limited)		

- d. Note which above are considered to be incomplete combustion

3. 10.2.3 Describe, using equations, the reactions of methane and ethane with chlorine and bromine. (2)

- a. Complete the following table (you'll be able to in the next few slides) with the complete reactions of methane and ethane with chlorine and bromine gas:

Reactants	Equation
Methane + chlorine	
Ethane + chlorine	
Methane + bromine	
Ethane + bromine	

4. 10.2.4 Explain the reactions of methane and ethane with chlorine and bromine in terms of a free-radical mechanism. (3)

- a. There are two types of bond breaking, complete the following table to describe each:

Types of Bond Breaking (Fission)	
Homolytic Fission	Heterolytic Fission

- b. For the halogenation of alkanes, we must follow several steps to break the stable bonds in simple alkanes (such as methane and ethane). You will need to be able to demonstrate halogenation by chlorine and bromine:

	Equation(s)	Explanation:
Part I: Initiation		
Part II: Propagation		
Part III: Termination		

1. (i) State and explain the trend in the boiling points of the first six alkanes involving straight-chains.

(2)

- (ii) Write an equation for the reaction between ethane and chlorine to form bromoethane. Explain this reaction in terms of a free-radical mechanism.

(5)

(Total 7 marks)